
Space Weather Forecast

Issued on Tuesday, 12 July 2022 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: R1-R2 blackouts likely, slight chance of R3 blackouts. G1/Minor Storms likely, slight chance of G2/Moderate Storms Day 1 into Day 2 (12-13 July). Slight chance of S1 throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with just Common-class flares in the last 24 hours. There are six numbered sunspots on the disc. The region in the SE has been the most active recently, with a complex magnetic structure. Two regions near centre disc are both large but with limited magnetic complexity. A newer region in the NE is still difficult to see clearly but may have some complexity. All other regions are relatively simple and stable. There are currently numerous large filaments on the Sun, with two large features in the southern hemisphere. There were limited signs of instability, however they will be monitored. No Earth-directed CMEs were observed in available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind showed signs of weak CME effects, combined with a recent coronal hole fast wind arrival. The wind speed was ambient for much of the period, rising steadily from 12/0530 UTC to reach near 470 km/s. The IMF has been mostly moderate with some strong peaks after the CME arrived at 11/1625 UTC and more recently when the fast wind arrived. The north-south component was moderately southward directed at times for much of the period, then starting varying moderately from 12/0500 UTC. The resultant geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with a slight chance of strong (X-class) flares.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on the 09 July may arrive either late on Day 1 (12 July) or early on Day 2 (13 July). The solar wind is currently at slightly elevated levels, likely under the influence of a fast wind from a coronal hole, but also perhaps with some weak CME influence. The fast wind may be superseded by the expected arrival of the CME, perhaps increasing the solar wind to strong levels. Otherwise, winds are expected to reach elevated levels on Days 1 and 2 before slowly decreasing. Overall geomagnetic activity is expected to be Unsettled to Active, with a Chance of G1/Minor Storms and a slight chance of G2/Moderate Storms with any CME effects. Geomagnetic activity then returning to mostly Quiet levels on Days 3 and 4 (14-15 July).

Energetic Particles / Solar Radiation: The high energy proton flux (greater than 10 MeV) is likely to remain at background levels. There is however a daily Slight Chance of S1 or greater, due to the presence of two relatively large sunspot regions on the centre disc, particularly as they are now moving across the western hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	60	50	1	1
Strong	G3	No	2	2	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)